REMARKS

In the Office Action mailed on July 29, 2004, claims 1-27 were rejected under 35 U.S.C. § 103(a) as being rendered obvious by U.S. Patent No. 5,936,616 to Balkanski et al., which is herein referred to as "the Balkanski reference," in view of European Patent 0974933 to Konstantinides et al., which is herein referred to as "the Konstantinides reference." However, after careful review of the Balkanski and Konstantinides references, claims 1-27 are believed to be clearly patentable over the proposed combination. Accordingly, Applicants respectfully traverse the rejection and request reconsideration of the present application in view of the arguments below.

Legal Precedents

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes *all* of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

Claimed Subject Matter

The present application includes independent claims 1, 12, 18 and 24. Each of the independent claims includes recitations relating to, *inter alias, lossless compression of image data.* Further, independent claims 1 and 12 include recitations relating to, *inter alias, applying the compression code tables to uncompressed image data.* Specifically, independent claim 1 recites:

> compiling and storing a plurality of compression mapping tables for converting uncompressed data representative of individual picture elements to lossless compressed data;
>
> applying at least first and second compression mapping tables from the stored plurality of compression mapping tables to subregions of an uncompressed image data stream to compress the subregions.

Independent claim 12 recites:

> defining a family of compression code tables for converting uncompressed image data to lossless compressed data;
>
> ...
>
> compressing the image data stream in accordance with the selected compression code tables at the compression station for decompression at the decompression station.

Similarly, independent claim 18 recites:

> a data compression station configured to store a plurality of compression code tables for conversion of image data to lossless compressed image data and to execute a compression routine in which an image data stream is converted to a compressed file by dividing into subregions and each subregion compressing in accordance with a compression code table selected from the plurality of compression code tables based upon which compression code table provides optimal lossless compression of the subregion.

Independent claim 24 recites:

> configuration code and a plurality of compression code tables stored on the machine readable medium, the configuration code including an algorithm for analyzing an image data stream, for compressing subregions of the image data stream by application of a plurality of compression code tables, and for compiling the compressed subregions into a lossless compressed data file.

Accordingly, each of the independent claims 1, 12, 18 and 24 includes recitations relating to the *compression of image data in a lossless fashion*, which is clearly described in the present application. Further, independent claims 1 and 12 include recitations relating to the *compression code tables being applied to uncompressed image data.*

The Claims Relate to Lossless Image Data Compression

In the present application, Applicants describe a technique for rapidly and optimally compressing and decompressing image data through the use of one or more compression code tables selected from a family of predefined tables. *See* Application, page 1, lines 5-8. Because the image files may be stored in raw and processed formats, many image files are quite large and consume considerable memory space. *See* Application, page 1, lines 11-30. Accordingly, the present application describes a technique for image data compression that analyzes the image data stream by subregions to identify the compression code table that provides the optimal compression for each subregion. *See* Application, page 3, lines 8-17. By utilizing the compression code tables, the image may be later regenerated to the original image data in a lossless fashion. *See* Application, page 20, line 31 to page 21, line 3. As such, the application clearly describes the *compression of image data in a lossless fashion*, and further describes *applying the compression code tables to uncompressed image data.*

Any Process that Employs Quantization is necessarily Lossy, not Lossless.

As a preliminary matter, Applicants note that the use of quantization is a lossy compression process. Quantization clearly compresses an image by reducing the bits

associated with the image through a many-to-one mapping. Once quantized, the image may not be recreated into the original image because the quantization drops bits from the image, which cannot be recovered. As one skilled in the art would recognize, the quantization of the image results in a lossy compression process, as illustrated by the definitions that are provided in the attached Appendix A. Specifically, the Appendix A includes three pages of definitions regarding various compression techniques found at the URL: http://my.engr.ucdavis.edu/~ssaha/glossary.html. Applicants again submit that these definitions reflect the understanding of one skilled in the art.

The Balkanski Reference Teaches Lossy, not *Lossless,* Compression.

In contrast to the claimed subject matter, the Balkanski reference is directed to a technique for compressing data to reduce the amount of data through a lossy compression process. *See* Balkanski et al., col. 1, lines 18-21. The Balkanski reference describes lossless image compression as compressing an image with data that may be mathematically restored to the original image, while lossy image compression does not preserve all the information and can not be restored to the original image. *See* Balkanski et al., col. 2, lines 52-58. Accordingly, the Balkanski system describes a data compression process that utilizes a quantizer unit 108 to minimize the bits utilized to display an image. *See* Balkanski et al., Fig. 1; col. 9, lines 4-25. In particular, the quantizer unit 108 discards bits, such as the 6 most significant bits and the 15 least significant bits, to provide greater compression of the image, which is a *lossy* compression process. *See* Balkanski et al., col. 9, lines 25-32. After the image has been quantized, the Balkanski reference describes further compressing the image by applying Huffman code tables 117 that are accessed by a coder unit 111a during compression and by a decoder unit 111b during decompression. *See* Balkanski et al., col. 10, lines 13-18. As a result, the Huffman code tables 117 are utilized to further compress data that has been processed (i.e. compressed) by the quantizer unit 108. The overall process is, then necessarily *lossy*, not lossless.

The Konstantinides Reference Teaches Lossy, not *Lossless,* Compression.

Similarly, the Konstantinides reference provides a simple metric for picture and text segments design to allow the text to be compressed at better ratios than pictures. *See* Konstantinides et al., page 3, paragraph 0015. In the Konstantinides system, a discrete cosine transformer 14 is coupled to a quantizer 18 and variable quantization subsystem 54 that includes a quantizer 58. *See* Konstantinides et al., Fig. 2; page 3, paragraphs 0022 and 0023; page 4, paragraph 0034. The quantizers 18 and 58 are specifically described as being coupled to quantization tables 16 that contain lossy quantization factors. *See* Konstantinides et al., page 3, paragraph 0023. After the image has been quantized, the Konstantinides system further compresses the quantized image in an entropy encoder 20 with Huffman tables 22. *See* Konstantinides et al., page 4, paragraph 0037. As a result, the entropy encoder 20 is further compressing quantized image data that has been compressed by the quantizer 18 and 58. Here again, this revisiting overall process is necessarily lossy, not lossless.

Any Combination of Balkanski and Konstantinides Would Necessarily Include Lossy, not *Lossless, Compression.*

Because the Examiner has rejected the independent claims 1, 12, 18 and 24 based on the same cited references, Applicants will discuss the recited features missing from the combination of the Balkanski and Konstantinides references for each of the independent claims 1, 12, 18 and 24 together. In the rejection, the Examiner asserted that the recited features of the independent claims 1, 12, 18 and 24 are disclosed by the combination of the Balkanski and Konstantinides references. However, the Examiner's rejection fails for at least two reasons. First, the Balkanski and Konstantinides references fail to disclose *lossless compression of image data*, which is clearly recited in the independent claims 1, 12, 18 and 24. Secondly, the Balkanski and Konstantinides references fail to disclose

applying the compression code tables to uncompressed image data, which is clearly recited in the independent claims 1 and 12. Hence, the Balkanski and Konstantinides references do not render the claimed subject matter obvious, as discussed below.

In the Balkanski and Konstantinides references lossy and lossless compression are clearly defined. For instance, in Balkanski, lossy compression is described as not preserving all of the information about an image, while lossless compression allows the exact mathematical restoration of the image data. *See* Balkanski et al., col. 2, lines 51-59. Similarly, in Konstantinides, lossy compression is described as discarding as much of the image as possible without significantly affecting the appearance of the image, while lossless is achieved without discarding any of the image data. *See* Konstantinides et al., page 2, paragraph 0003. Accordingly, any reference that describes quantization of an image is utilizing a lossy compression process.

In the rejection, the Examiner asserted that the recited features of the independent claims 1, 12, 18 and 24 are disclosed by the combination of the Balkanski and Konstantinides references. Specifically, the Examiner relied upon the Balkanski reference to disclose all of the claimed subject matter, but admitted that the Balkanski reference does not expressly teach lossless compression. In an attempt to cure this deficiency, the Examiner asserted that the Konstantinides reference discloses an "entropy encoder 20 using Huffman tables 22 for converting uncompressed image data representative of individual picture elements from quantizer 18 into lossless compressed image data." However, as noted above, neither the Balkanski reference nor the Konstantinides reference disclose or teach *lossless compression of image data* or *applying the compression code tables to uncompressed image data.*

The Balkanski and Konstantinides References Fail to Teach or Suggest *Lossless Compression of Image Data*

First, each of the independent claims 1, 12, 18 and 24 includes recitations relating to the *lossless compression of image data*, which is not disclosed by the Balkanski and Konstantinides references, alone or in combination. With regard to the Balkanski reference, it does not disclose or teach *lossless compression of image data*. As noted above, the Examiner admitted that the Balkanski reference does not expressly teach lossless compression. Indeed, the Balkanski reference describes the use of quantization via the quantizer unit 108 for all of the image data. *See* Balkanski et al., Fig. 1; col. 9, lines 4-25. The quantizer unit 108 discards bits, such as the 6 most significant bits and the 15 least significant bits, to provide greater compression of the image, which is a lossy compression process. *See* Balkanski et al., col. 9, lines 25-32. Further, based on the definition within the Balkanski reference, the use of quantization is a lossy compression process because all of the image data is not preserved. *See* Balkanski et al., col. 2, lines 52-58. Accordingly, once quantized, the remaining bits may not recreate the original image because the quantization discards bits from the original data. *See* Balkanski et al., col. 9, lines 25-32. As such, the Balkanski reference describes a lossy compression process, not lossless compression, as claimed.

Furthermore, the Konstantinides reference describes an entropy encoder 20 that further compresses quantized image data with Huffman tables 22. After the image has been quantized, the Konstantinides reference describes further compressing the quantized image in the entropy encoder 20 with Huffman tables 22. *See* Konstantinides et al., page 4, paragraph 0037. That is, the quantizer 18 and quantizer 58 compress all of the image data that is provided to the entropy encoder 20. As such, because the Konstantinides reference clearly discloses the use of quantization, it cannot teach or disclose a *lossless compression of an image*. Accordingly, the Balkanski and Konstantinides references together, do not teach lossless compression as claimed, and thus, do not render obvious the subject matter of independent claims 1, 12, 18 and 24.

The Balkanski and Konstantinides References Fail to Teach or Suggest *Applying the Compression Code Tables to Uncompressed Image Data*

Secondly, the independent claims 1 and 12 include recitations relating to *applying the compression code tables to uncompressed image data,* which are also not disclosed or suggested by the Balkanski and Konstantinides references, alone or in combination. With regard to the Balkanski reference, the quantizer unit 108 of Balkanski selects one of four tables, which relate to different compression ratios, to compress the image data by discarding bits. *See* Balkanski et al., col. 9, lines 25-32; col. 18, lines 1-18. Because the coder unit 111a translates the data after the quantizer unit 108, the image data has already been compressed before the Huffman code tables 117 are applied. As a result, the Huffman code tables 117 are applied by the coder unit 111a after the data has been compressed. Clearly, the Huffman code tables 117 are not applied to uncompressed data, much less uncompressed image data representative of individual picture elements. Accordingly, the Balkanski reference fails to disclose or teach *applying the compression code tables to uncompressed image data.*

Furthermore, with regard to the Konstantinides reference, the quantizer 18 and quantizer 58 compress all of the image data that is provided to the entropy encoder 20. That is, the entropy encoder 20 receives quantized image data, which is compressed image data from the quantizer 18 and quantizer 58. Only after the image has been quantized does the entropy encoder 20 further compress the quantized image data with Huffman tables 22. *See* Konstantinides et al., page 4, paragraph 0037. As a result, the entropy encoder 20 applies the Huffman tables 22 after the data has been compressed. Because the Konstantinides reference clearly discloses using the entropy encoder 20 after quantization, it cannot teach or disclose a *applying the compression code tables to uncompressed image data.* Accordingly, the Balkanski and Konstantinides references, together, fail to teach this recitation, and thus, do not render obvious the subject matter of independent claims 1 and 12.

Because the Examiner has failed to show that the cited references disclose *all* of the claimed elements, the Examiner has failed to establish a *prima facie* case of obviousness. Therefore, Applicants respectfully request the Examiner to withdraw the rejection and allow claims 1-27.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims 1-27. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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